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PATENT APPLICATION
Docket No. 11960.224

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Box: PATENT APPLICATION
Assistant Commissioner for Patents
Washington, DC 20231

Sir:

Transmitted herewith for filing is the patent application of Curtis Thompson for LASER ENHANCED PERSONAL DATA ASSISTANT comprising seventeen (17) pages of specification and claims, and a single signature Declaration, Power of Attorney and Petition.

Enclosed also are:

- x Five (5) sheets of drawings
- x An assignment of the invention to 3Com, including a Form PTO-1595 recordation cover sheet.
- A certified copy of an _____ application.
- An Associate Power of Attorney
- A Verified Statement to Establish Small Entity Status Under 37 C.F.R. § 1.9 and 37 C.F.R. § 1.27
- x A Certificate of Mailing by "Express Mail" certifying a filing date of March 9 , 1998 by use of Express Mail Label No. EM521657065US.

The filing fee has been calculated as shown below.

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For	No. Filed	No. Extra	Rate	Fee	or	Rate	Fee
Basic Fee				\$395			\$790
Total Claims	18 - 20 =	0	x 11=	\$	or	x 22 =	\$ 0
Ind. Claims	3 - 3 =	0	x 41=	\$	or	x 82 =	\$ 0
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Please debit Deposit Account No. 23-3178 in the amount of \$_____ for the government filing fee.

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Docket: 11960.224

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- Patent application in the name of Curtis Thompson for LASER ENHANCED PERSONAL DATA ASSISTANT (17 pgs.)
- Formal Drawings (five (5) sheets)
- Assignment with Form PTO-1595 cover sheet (4 pgs.)
- Declaration, Power of Attorney and Petition (2 pgs.)
- Transmittal Letter (3 pgs.)
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- Postcard

Dated this 9 day of March 1998.

Respectfully submitted,



Michael F. Krieger
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PATENT APPLICATION
Docket No. 11960.224

UNITED STATES PATENT APPLICATION

of

CURTIS THOMPSON

for

**LASER ENHANCED
PERSONAL DATA ASSISTANT**

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ATTORNEYS AT LAW
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BACKGROUND OF THE INVENTION

1. The Field of the Invention

The present invention relates to personal data assistants (PDAs) and, more specifically, PDAs or adapters therefor with enhanced data transmission and receiving capabilities.

2. Present State of the Art

Personal data assistants (hereinafter "PDAs") are small, substantially hand-sized computers that are used for storing, manipulating, and retrieving a defined amount of data. One example of a PDA is the PalmPilot[®] manufactured by 3Com. The PalmPilot[®] functions primarily as an electronic day planner and address recorder.

Although PDAs are increasing in popularity, they still have several shortcomings which limit their use. For example, transferring data between a PDA and a personal or network computer is accomplished by physically electrically coupling a cradle to the host computer. The PDA is then physically electrically coupled to the cradle. Software loaded in the host computer is then used to access the PDA and download or upload information therebetween. This process is somewhat time consuming and annoying when all that is wanted is to quickly download or dump information from the PDA into the computer. The problem is exacerbated when it is needed to frequently download information.

Another shortcoming of conventional PDAs is that it is difficult and time consuming to manually input data into the PDA. PDAs typically do not have a keyboard. Information is thus manually input by either using a special pen to scribe letters onto a screen or by selecting letters or numbers displayed on the screen. Such inputting of data can be extremely laborious and time consuming.

OBJECTS AND BRIEF SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide PDAs and/or adapters for PDAs that can quickly and easily download information into a host computer without having to physically electrically couple the PDA to the host computer.

Yet another object of the present invention is to provide PDAs and/or adapters for PDAs that can be used to quickly input data into the PDA.

To achieve the foregoing objectives, and in accordance with the invention as embodied and broadly described herein, an adapter for a PDA is provided. The adapter has a substantially L-shaped housing that can be physically and electrically coupled with a conventional PDA. Disposed within the housing of the adapter is a micro processor and a light source which are energized by enclosed batteries. In one embodiment, the light source is a laser. In another embodiment, the light source is a light emitting diode.

The light source emits a light beam which can be converted into a digital signal. This can be accomplished by using a switch which turns the light source on and off. Alternatively, a liquid crystal display (LCD) can be positioned in front of the light source which can then be selectively turned on and off to block the light beam.

When it is desired to download the data stored on the PDA, the micro processor in the adapter transmits a corresponding series of digital pulses using the light source. These pulses are received by a photo detector of a host computer. The photo detector is coupled with a processor which receives, processes, and stores the data stream. The adapter can thus be used to download information from the PDA to a host computer without effecting a physical electrical connection therebetween.

The adapter can also be used to automatically input bar code readings into the PDA. In this embodiment, the light source emits a thin highly culminated light beam such as that used in conventional scanners. By manually moving the combined PDA and adapter, the light beam is scanned across the bar code. A photo detector is mounted on the adapter and

1 is positioned such that the portion of the light beam reflecting off the bar code is received by
2 the photo detector as an analog signal. The analog signal is then converted into a digital
3 signal which is subsequently forwarded to the microprocessor and subsequently to the PDA.

4 As a result of being able to scan bar code readings into the PDA, the functionality
5 of the PDA is substantially increased. For example, the PDA can now effectively be used
6 for monitoring and controlling inventory or other products on which bar codes can be
7 positioned.

8 In yet another embodiment, it is envisioned that the electronics of the adapter can
9 be integrally incorporated into a PDA so as to eliminate the need for the adapter. However,
10 the adapter is advantages in retrofitting to existing PDAs. Furthermore, by using the
11 removable adapter, the size of the PDA can be kept to a minimum.

12 These and other objects, features, and advantages of the present invention will
13 become more fully apparent from the following description and appended claims, or may be
14 learned by the practice of the invention as set forth hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the manner in which the above-recited and other advantages and objects of the invention are obtained, a more particular description of the invention briefly described above will be rendered by reference to specific embodiments thereof which are illustrated in the appended drawings. Understanding that these drawings depict only typical embodiments of the invention and are not therefore to be considered to be limiting of its scope, the invention will be described and explained with additional specificity and detail through the use of the accompanying drawings in which:

Figure 1 is a front perspective view of a PDA separated from an adapter;

Figure 2 is a block diagram of the components of the adapter shown in Figure 1 and components of a computer;

Figure 3 is a block diagram of the adapter shown in Figure 1 interacting with a bar code;

Figure 4 is a block diagram of the adapter shown in Figure 1 interacting with a remote controllable device; and

Figure 5 is a perspective view of a PDA incorporating the electronics of the adapter shown in the Figure 1.

1 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

2 Depicted in Figure 1 is one embodiment of an inventive adapter 10 for use with a
3 conventional PDA 12. PDAs come in a variety of makes, styles, and configurations. In one
4 embodiment of the present invention, PDA 12 includes a PalmPilot® made by 3Com. PDA
5 12 includes a low profile box shaped housing 9 having a front face 14 extending from a top
6 end 16 to a bottom end 18. Mounted on front face 14 is a display screen 19. Positioned at
7 bottom end 18 are control buttons 22. Disposed within housing 9 is a micro processor 11
8 coupled with memory 13 such as RAM, and batteries 15 for powering the system. The
9 microprocessor interacts with an operating system that runs selective software depending on
10 the intended use of PDA 12. In one conventional use, memory 13 is loaded with software
11 code for operating an electronic day planner and address notebook.

12 Adapter 10 has a substantially L-shaped housing 24 which comprises a base 26 and
13 an arm 28. Arm 28 extends to a free end 30. In one embodiment, a support back 21 extends
14 between base 26 and arm 28. The present invention also includes means for removably
15 coupling adapter 10 to PDA 12. By way of example and not limitation, bottom end 18 of
16 PDA 12 includes a tapered section 20. Recessed within base 26 is a complimentary socket
17 32. Socket 32 is configured to receive tapered section 20 so as to removably secure PDA 12
18 to adapter 10. Of course, there are a variety of alternative configurations which can be used
19 for helping to secure PDA 12 within socket 32. For example, spring biased members or
20 interlocking ridges can be used for further facilitating the connection. In yet other alternative
21 embodiments, there are a variety of different latches, straps, and connectors that can be used
22 for securely holding PDA 12 to adapter 10.

23 Means are also provided for effecting electrical communication between PDA 12
24 and adapter 10. By way of example and not limitation, a first interface connector 34 is
25 mounted to bottom 18 of PDA 12. First interface connector 34 is electrically coupled with
26 the circuitry within PDA 12. Disposed within socket 32 of adapter 10 is a second interface

1 connector 36. Interface connectors 34 and 36 are configured to electrically couple together
2 when PDA 12 is coupled to adapter 10. Interface connectors 34 and 36 permit the transfer
3 of electronic data between PDA 12 and housing 10. In one embodiment, interface connectors
4 34 and 36 comprise an RS232 connection.

5 Figure 2 in part depicts a functional block diagram of the electrical system of adapter
6 10. As depicted therein, interface connector 36 is electrically coupled with a micro processor
7 38. Micro processor 38 and the other electrical components are driven by a power source
8 40. In one embodiment, power source 40 can comprise the same type of battery system as
9 used in a conventional PDA. Micro processor 38 is selectively operated by a series of
10 control buttons 42. Control buttons 42 can be positioned on adapter 10 and/or on PDA 12.
11 In an alternative embodiment, micro processor 38 can be eliminated. In this embodiment,
12 the processing functions would be handled by micro processor 11 within PDA 12.

13 In one embodiment, a light source 44 is electrically coupled with micro processor
14 38. In other embodiments, light source 44 can be directly coupled with power source 40.
15 As depicted in Figure 1, light source 44 is preferably positioned within arm 28 so as to emit
16 a light beam 47 out through a window 46 at free end 30.

17 Light source 44 can have a variety of configurations. For example, in one
18 embodiment light source 44 can be a simple light emitting diode such as an infrared emitter.
19 In another embodiment, light source 44 can comprise a laser. In one embodiment, the laser
20 can comprise a red light emitting laser wherein the light is sufficiently collimated that the
21 laser can be used as a conventional laser display pointer for use in lectures or presentations.

22 Also depicted in Figure 3 is a simple block diagram of a host computer 70 such as
23 a personal computer or a network computer. Computer 70 includes a photo detector 72
24 coupled to a processor 74 through an amplifier 76. A light emitting diode 78 is also
25 electrically coupled to processor 74 and is operated by a driver 80.

26

1 Where light source 44 is used for downloading information from PDA 12 to host
2 computer 70, means are also provided for converting light beam 47 into a digital signal. This
3 can be accomplished in a variety of different ways. As depicted in Figure 3, by way of
4 example and not limitation, a switch 48 can be positioned between micro processor 38 and
5 light source 44. Micro processor 38 operates switch 48 to turn light source 44 off and on at
6 select high frequency intervals such that light beam 47 emitted from light source 44 is
7 converted into a digital signal. The digital signal is transmitted to photo detector 72 of
8 computer 70 and subsequently decoded by processor 74. Where light source 44 is a laser,
9 the above configuration can be used to download data from PDA 12 to host computer 70
10 over an extended distance. In one embodiment, light source can be used to download data
11 to host computer 70 over a distance greater than about two feet, preferably greater than
12 about five feet, and more preferably greater than about ten feet.

13 The transfer is accomplished by aiming light beam 47 at photo detector 72 and then
14 pressing a select control button 42 that instructs micro processor 38 to transfer the stored data
15 in PDA 12 in digital format using light beam 47. Where light source 44 is simply a light
16 emitting diode, or other non-collimated light source, adapter 10 and PDA 12 may have to
17 be set down close to photo detector 72 and aligned therewith before attempting to transfer
18 the data. In either event, data is quickly and effectively downloaded from PDA 12 to
19 computer 70 without the required use of a cradle or other physical electrical connection.

20 In yet another alternative embodiment for converting light beam 47 from light
21 source 44 into a digital signal, rather than using switch 48, a liquid crystal display (LCD) 52
22 is positioned within adapter 10 in the path of light beam 47. LCD 52 is controlled to turn
23 on and off by micro processor 38. When LCD 52 is on, LCD 52 blocks light beam 47 from
24 emanating from adapter 10. Conversely, when LCD 52 is off, light beam 47 freely emanates
25 from adapter 10. Accordingly, by micro processor 38 turning LCD 52 on and off at select
26

1 high frequencies, light beam 47 is converted into digital signals for being received by photo
2 detector 72.

3 If desired, comparable technology can also be used to upload data from computer
4 70 to PDA 12. By way of example, adapter 10 can include a photo detector 56 that is
5 coupled with micro processor 38 through an amplifier 57. Digital signals transmitted by
6 LED 78 are received by photo detector 56 and subsequently decoded by micro processor 38
7 or are transferred to PDA 12 for decoding.

8 Adapter 10 can also be configured for reading a bar code 54. For example, as
9 depicted in Figures 1 and 3, photo detector 56 is positioned at free end 30 of arm 28 adjacent
10 to window 46. Photo detector 56 is electrically coupled to an analog to digital converter 58
11 which is coupled with micro controller 38 through amplifier 57. Light source 44 and photo
12 detector 56 are selectively positioned such that as light beam 47 is manually scanned across
13 bar code 54, a portion 61 of light beam 47 is reflected off of the reflective sections of bar
14 code 54 and is received by photo detector 56. Portion 61 of light beam 47 detected by photo
15 detector 56 is in an analog signal which is converted to a digital signal by converter 58. The
16 signal is then transferred to microprocessor 38 for decoding and subsequently sent to PDA
17 12. In this embodiment, light source 44 emits a thin highly collimated light beam 47 such
18 as those used in conventional scanners.

19 By using the above configuration, bar codes can be quickly entered into PDA 12
20 without having to manually input the information. Depending on the intended use and
21 operational software, PDA 12 can either simply store the bar code reading or can be used to
22 access other information based on the bar code reading. By using adapter 10, PDA 12 can
23 be used for inventory control or in other situations where bar codes can be used.

24 Adapter 10 can also interact with PDA 12 to facilitate operation of a remote-
25 controllable device such as a television, VCR, or stereo. As depicted in Figure 4, a remote-
26 controllable device 80 is depicted as comprising a photo detector 82 which is electrically

1 coupled with a processor 84 and device electronics. By loading appropriate software in PDA
2 12, light source 44 can be operated by microprocessor 38 to emit low speed pulses to
3 remote-controllable device 80 for remotely controlling the device.

4 In one embodiment it is envisioned that software code corresponding to a plurality
5 of different remote-controllable device 80 is loaded in memory 13 of PDA 12. Display
6 screen 19 can be used to access a list of available remote-controllable device. By choosing
7 a select remote-controllable device from the list, processor 11 can operate the corresponding
8 software to assign control buttons to perform specific functions relative to operation of the
9 select remote-controllable device. Alternatively, a list of functional operations can be listed
10 on display screen 19. By selecting a desired function, processor 11 or 38 operates light
11 source 44 to emit a desired light pulse that when received by the select remote-controllable
12 device signals the device to perform the desired function. For example, by accessing
13 software on the PDA for a television, depressing a select control button 42 on either PDA
14 12 or adapter 10 generates a low speed pulse that turns the television on or off. Of course
15 other functions such as volume or channels can also be selectively changed. Performing
16 functions such as downloading data stored in memory 13 of PDA 12 can be executed using
17 similar steps.

18 It is noted that the operation of adapter 10 for downloading information to computer
19 70 is different than operation of adapter 10 for remote control of a device. This is because
20 the bit rates are substantially different for the different uses. From a practical standpoint,
21 downloading information from PDA 12 to computer 70 requires a bit rate of about 20 kbps
22 or higher. In contrast, operation of a remote-controllable device requires a bit rate of about
23 10 bps.

24 As depicted in Figure 5, the present invention also envisions that the electronic
25 circuitry of adapter 10, as depicted and discussed with regard to Figures 1-5, can be integrally
26 incorporated into a single PDA 60. For example, PDA 60 is depicted having a top end 62.

1 Formed at top end 62 is a window 64 through which a light beam from a light source within
2 PDA 60 can emanate. Adjacent to window 64 is photo detector 56. Of course,
3 circuitry which is already found in a conventional PDA, such as a micro processor and a
4 power system, need not be redundantly transferred from adapter 10 into PDA 60.

5 The present invention may be embodied in other specific forms without departing
6 from its spirit or essential characteristics. The described embodiments are to be considered
7 in all respects only as illustrative and not restrictive. The scope of the invention is, therefore,
8 indicated by the appended claims rather than by the foregoing description. All changes
9 which come within the meaning and range of equivalency of the claims are to be embraced
10 within their scope.

11 What is claimed and desired to be secured by United States Letters Patent is:
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1. An adapter for removable attachment to a PDA, the adapter comprising:
 - (a) an interface connector configured to removably electrically couple with the PDA;
 - (b) a micro controller electrically coupled with the interface connector;
 - (c) a light source configured to emit a light beam; and
 - (d) a photo detector electrically coupled to the micro controller.
2. An adapter as recited in claim 1, wherein light source is a laser.
3. An adapter as recited in claim 1, further comprising means electrically coupled to the micro controller for converting electrical signals between analog and digital.
4. An adapter as recited in claim 3, wherein the light source and the photo detector are configured such that the light beam from the light source can be reflected off a bar code and received by the photo detector.
5. An adapter as recited in claim 1, further comprising means for converting the light beam from the light source into a digital signal.
6. An adapter as recited in claim 5, wherein the means for converting the light beam comprises switching circuitry for turning the light source on and off.

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7. An adapter as recited in claim 5, wherein the means for converting the light beam comprises an LCD positioned in the path of the light beam, the LCD being operable between an on position which blocks the light beam and an off position which allows the light to pass therethrough.

1 8. An electrical apparatus comprising:

2 (a) a PDA comprising a low profile box shaped case having a front face
3 extending between a top end and a bottom end, a display screen is positioned on the
4 front face and a first interface connector is positioned at the bottom end, the case of
5 the PDA enclosing a microprocessor;

6 (b) an adapter comprising:

7 (i) a substantially L-shaped housing comprising a base and an
8 arm, the arm projecting from the base to a free end;

9 (ii) a second interface connector mounted to the base of the
10 housing, the second interface connector being configured to electrically
11 couple with the first interface connector for transferring electrical signals
12 therebetween;

13 (iii) means for removably coupling the housing of the adapter to
14 the PDA such that the first and second interface connectors are electrically
15 coupled and the free end of the arm is positioned at the top end of the PDA
16 housing;

17 (iv) a light source at least partially disposed within the arm and
18 configured to emanate a light beam through the free end thereof;

19 (v) a photo detector at least partially positioned at the free end of
20 the arm; and

21 (vi) an analog to digital converter disposed within the housing and
22 electrically coupled to the photo detector.

23
24 9. An electrical apparatus as recited in claim 8, wherein a micro processor is
25 disposed within the adapter housing and is electrically coupled with the analog to digital
26 converter.

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1 10. An electrical apparatus as recited in claim 8, wherein the adapter housing
2 comprises a battery compartment.

3
4 11. An electrical apparatus as recited in claim 8, wherein the light source is a
5 laser.

6
7 12. An electrical apparatus as recited in claim 11, wherein the laser emits a visible
8 red light that is sufficiently collimated to function as a pointer.

9
10 13. An electrical apparatus as recited in claim 8, wherein the adapter further
11 comprises a manual button for turning the light source on and off.

12
13 14. An electrical apparatus as recited in claim 8, wherein the light source and the
14 photo detector are configured such that the light beam from the light source can be reflected
15 off a bar code and received by the photo detector.

16
17 15. An electrical apparatus as recited in claim 8, further comprising an LCD
18 positioned in the path of the light emitting from the light source, the LCD being operable
19 between an on position which block light from passing therethrough and an off position
20 which allows light to pass therethrough.

1 16. A PDA comprising:

2 (a) a housing having a front face extending between a top end and an
3 opposing bottom end, a display screen is positioned on the front face and an
4 interface connector is positioned at the bottom end,

5 (b) a micro controller is disposed within the housing and is electrically
6 coupled to the connector;

7 (c) a laser is disposed within the housing and is configured to emit a light
8 beam through the top end of the housing;

9 (d) a analog to digital converter is disposed within the housing and is
10 electrically coupled with the micro controller;

11 (e) a photo detector is positioned at the top end of the housing and is
12 configured to receive reflected light from the laser.

13
14 17. A PDA as recited in claim 16, further comprising means for converting light
15 from the laser into a digital signal.

16
17 18. A PDA as recited in claim 16, wherein the laser emits a visible red light that
18 is sufficiently collimated to function as a pointer.

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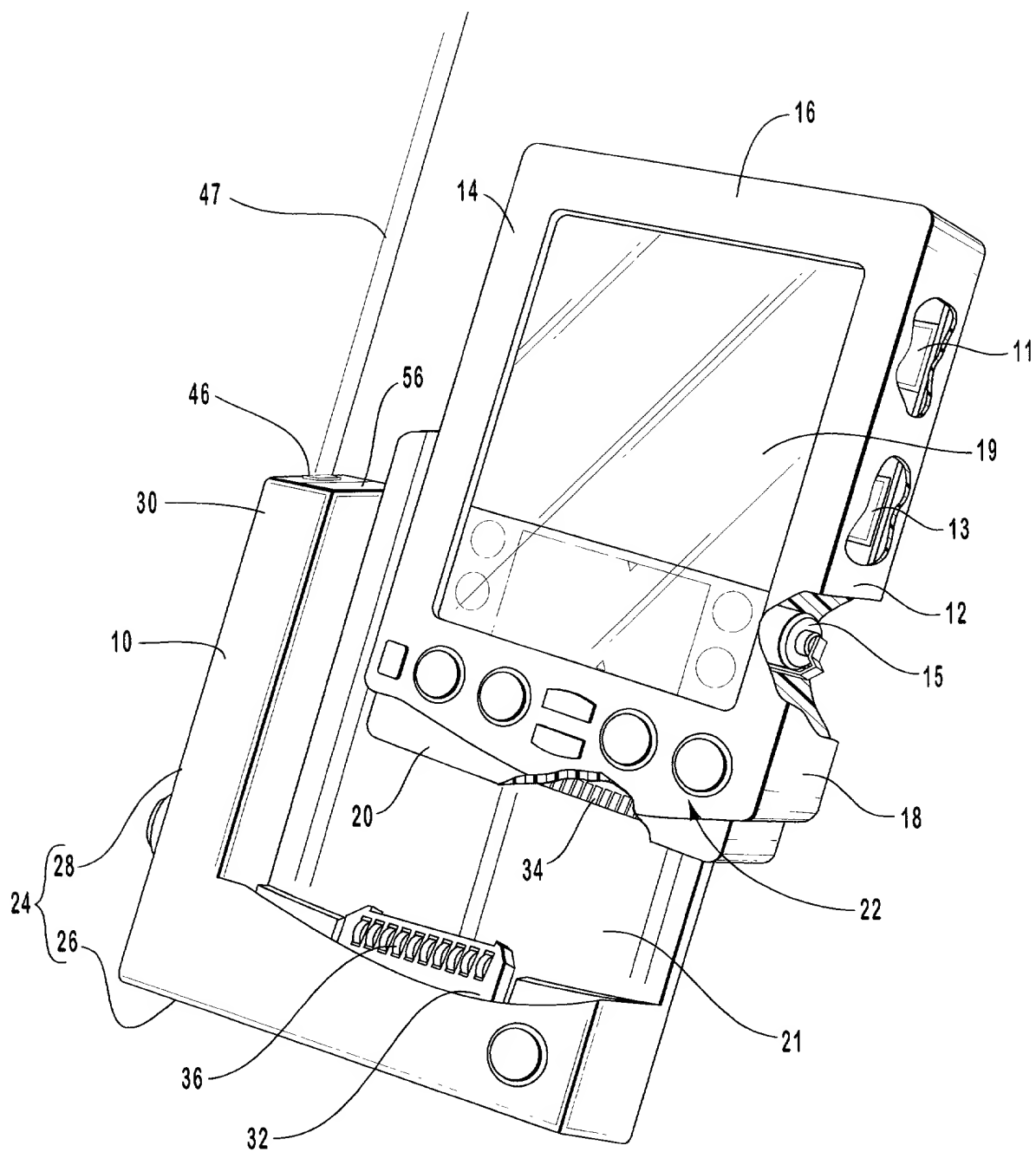


FIG. 1

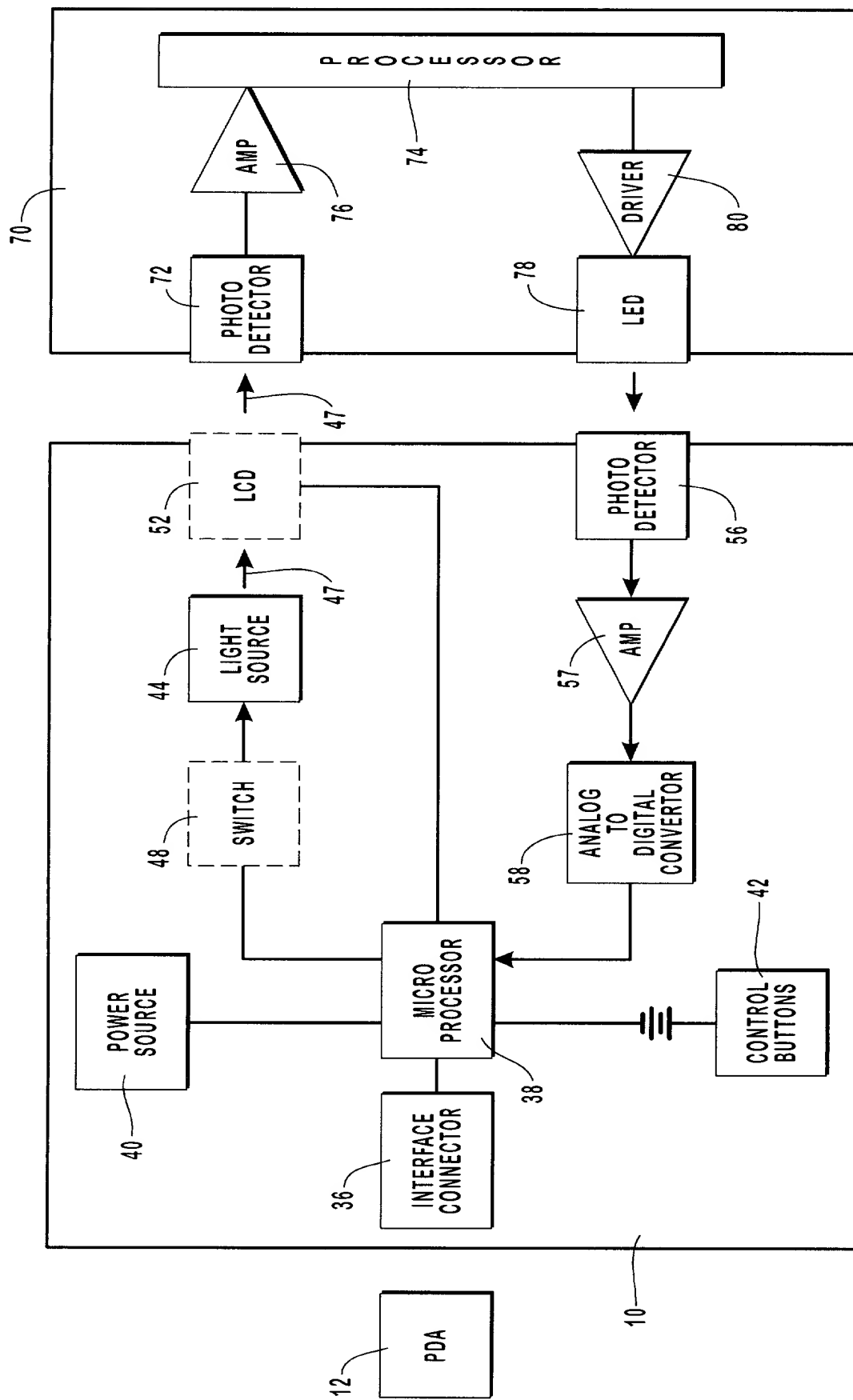


FIG. 2

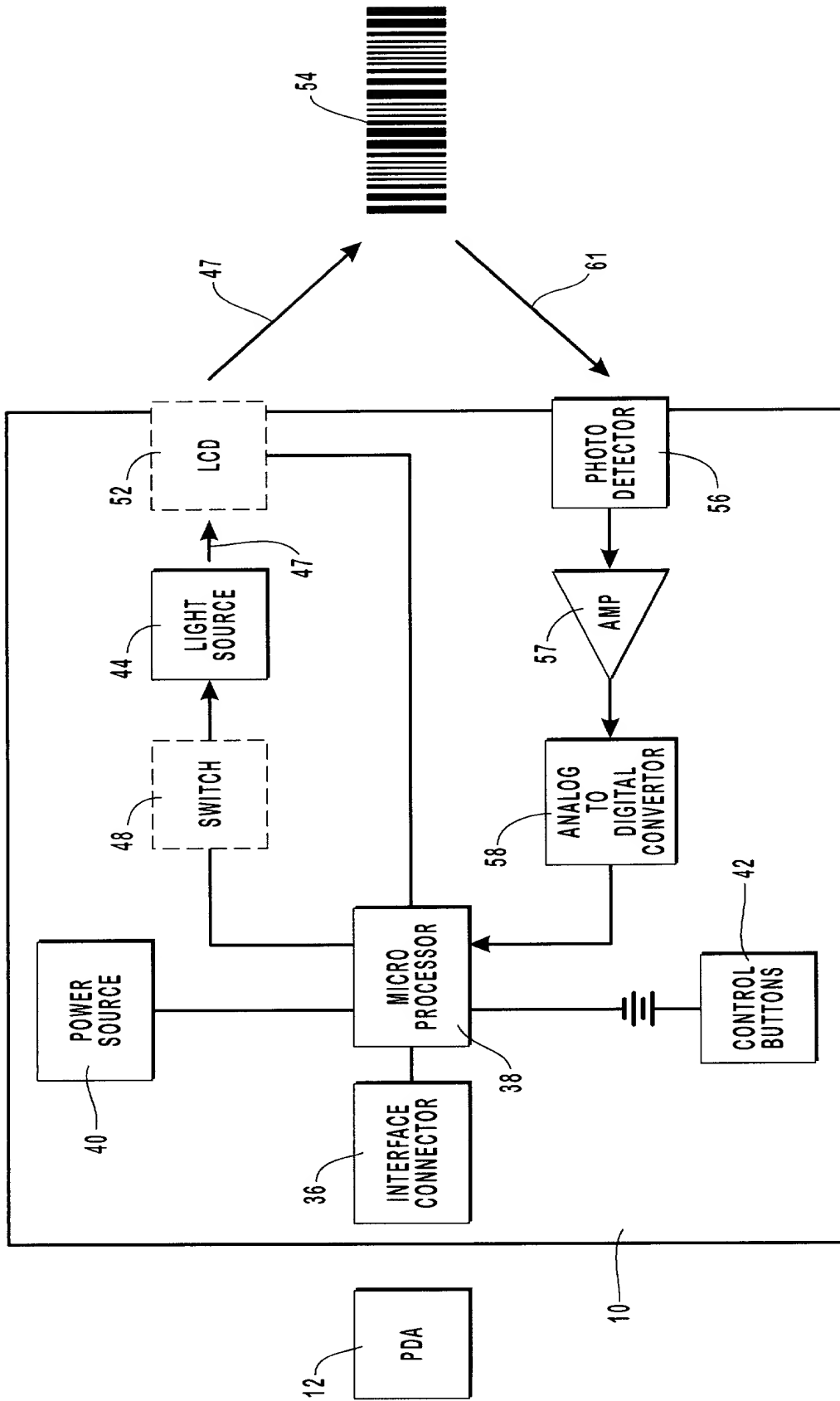


FIG. 3

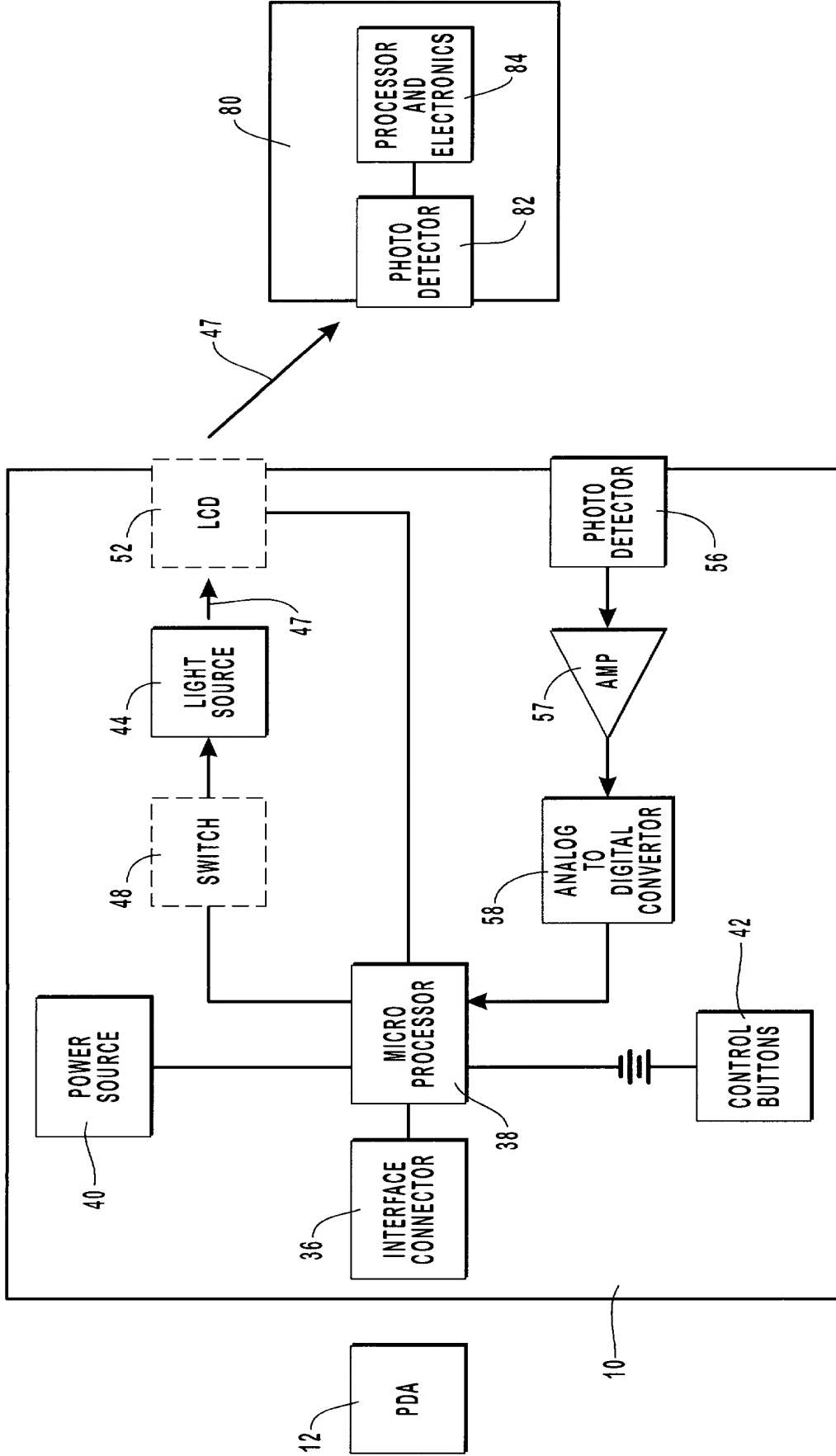


FIG. 4

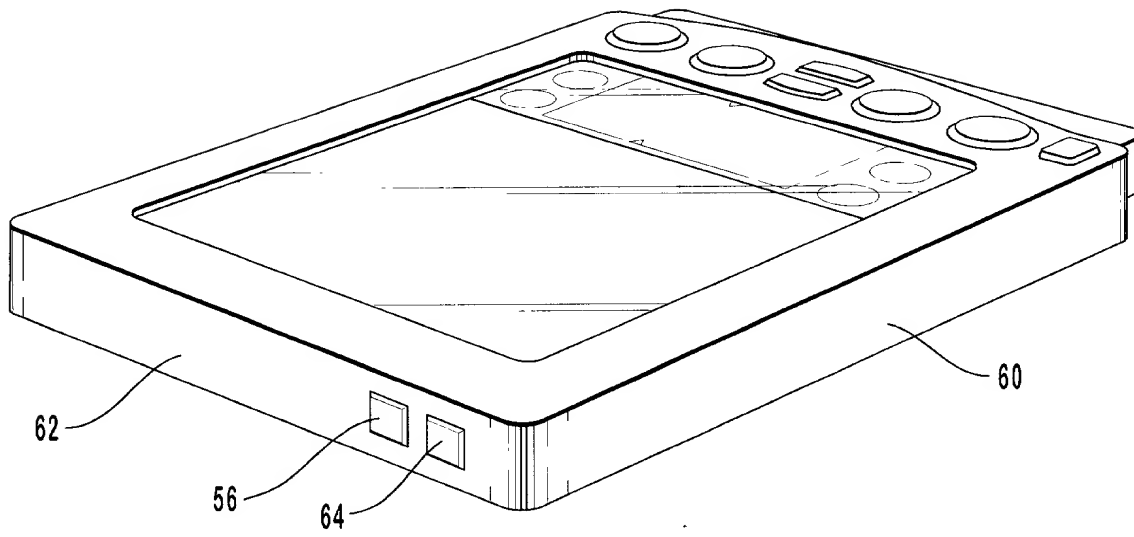


FIG. 5

DECLARATION, POWER OF ATTORNEY, AND PETITION

I, Curtis Thompson, declare: that I am a citizen of the United States of America; that my residence and post office address is 1481 West Bluemont Drive, Salt Lake City, UT 84123; that I verily believe I am the original, first, and sole inventor of the subject matter of the invention or discovery entitled LASER ENHANCED PERSONAL DATA ASSISTANT, for which a patent is sought and which is described and claimed in the specification attached hereto; that I have reviewed and understand the contents of the above-identified specification, including the claims; and that I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Section 1.56(a) of Title 37 of the Code of Federal Regulations.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful, false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful, false statements may jeopardize the validity of the application or any patent issuing thereon.

I hereby appoint as my attorneys and/or patent agents: RICK D. NYDEGGER, Registration No. 28,651; DAVID O. SEELEY, Registration No. 30,148; JONATHAN W. RICHARDS, Registration No. 29,843; JOHN C. STRINGHAM, Registration No. 40,831; MICHAEL F. KRIEGER, Registration No. 35,232; BRADLEY K. DeSANDRO, Registration No. 34,521; JOHN M. GUYNN, Registration No. 36,153; GREGORY M. TAYLOR, Registration No. 34,263; DANA

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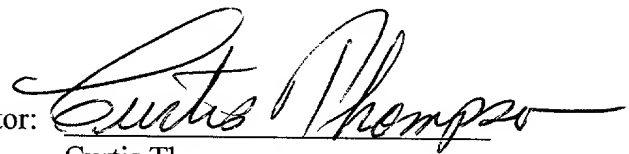
L. TANGREN, Registration No. 37,246; KEVIN B. LAURENCE, Registration No. 38,219; ERIC L. MASCHOFF, Registration No. 36,596; JEFFREY L. RANCK, Registration No. 38,590; C. J. VEVERKA, Registration No. 40,858; ROBYN L. PHILLIPS, Registration No. 39,330; DAVID B. DELLENBACH, Registration No. 39,166; TIMOTHY M. FARRELL, Registration No. 37,321; JOHN N. GREAVES, Registration No. 40,362, VANESSA B. PIERCE, Registration No. P-42,074; LENA I. VINITSKAYA, Registration No. 39,448; KEVIN K. JOHANSON, Registration No. 38,506; R. BURNS ISRAELEN, Registration No. P-42,685; and MICHAEL T. SANDERSON, Registration No. P-43,082, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith. All correspondence and telephonic communications should be directed to:

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Wherefore, I pray that Letters Patent be granted to me for the invention or discovery described and claimed in the foregoing specification and claims, declaration, power of attorney, and this petition.

Signed this 26 day of Feb 1998.

Inventor:



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